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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant: Daniel Alroy

Serial No: 09/871,560

Filed: May 31, 2001

For: Concepts and methods for identifying brain correlates of elementary mental states

Examiner: Jerry Lin

Art Unit: 1631

Mail Stop Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

REPLY BRIEF

May It Please The Honorable Board:

This reply brief is submitted in response to the Examiner's Answer dated May 29, 2008.

No fee is believed due with this response.

I. REAL PARTY IN INTEREST

The real party in interest of Application Serial No. 09/871,560 is:

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II. RELATED APPEALS AND INTERFERENCES

There are currently, and have been, no related Appeals or Interferences regarding Application Serial No. 09/871,560.

III. STATUS OF THE CLAIMS

Claim is rejected and the rejection of claim 6 is appealed.

IV. STATUS OF AMENDMENTS

No amendments were made after Final Rejection and all previous amendments were entered and are reflected in the claims included in Appendix I.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The summary of the claimed subject matter is found in the Appeal Brief, filed on March 10, 2008.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claim 6 is rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement and under the requirement for enablement.

VII. ARGUMENTS

Applicant respectfully submits that claim 6 is fully enabled and supported in the specification of the present invention. Thus, reversal of the Final Rejection (hereinafter termed “rejection”) of claim 6 under 35 U.S.C. §112, first paragraph and 35 U.S.C. §103(a) is respectfully requested.

1. **Rejection of Claim 6 under 35 U.S.C. §112, first paragraph**

Reversal of the rejection of claim 6 under 35 U.S.C. §112, first paragraph is respectfully requested because the rejection makes the following crucial errors. The Rejection erroneously states that present invention as claimed in claim 6 does not comply with the written description requirement.

1.1 **Examiner’s Answer. New Matter Rejection (pages 4-7).**

Appellant Response: The Examiner’s answer reiterates reasons given in the Final Office Action for rejecting claim element 6.1, passing in silence over Applicant Response presented in the Appeal Brief. The Final Office Action states (point 6, page 4): “The instant specification does not teach one of ordinary skill the art of how to establish correspondence between the submodality element of sensation and the external stimulus that normally elicits and a voluntary behavioral response.”

In the Appeal Brief, appellant responded as follows (Section 4.1): “The difference between the first and the second claim elements clarifies the issue. The first claim element involves psychophysics. It does not require, and typically does not involve, reference to the brain. The second claim element does involve brain response. Psychophysics is a hundred-year-old discipline. Its techniques are well known to those skilled in the art and do not need to be taught. In many cases in fact, descriptions of neuropsychological tests omit the psychophysics stage and proceed directly to the stage that involves brain response. The Trivedi patent is an example of that practice. The first claim element makes explicit that publicly observable behavioral responses can be correlated with sensations, which are not publicly observable.”

While claim element 6.3 encapsulates claim 6, claim element 6.1 is a desirable, rather than a necessary, part of the claim 6. In view of the fact that the Examiner Response returns to this matter several more times leads appellant to repeat that psychophysics is a familiar to those skilled in the art, and as a consequence, it is often not spelled out in patents.

Examiner's Answer (page 2, first paragraph)

"Step 2 of claim 6 recites 'detecting immediately following said external stimulus and corresponding behavioral response, brain loci that manifest transient increase activation.'" The Examiner's Answer then cites various references to the specification stating: "The cited pages in the specification do not disclose a step of immediately detecting brain loci after step 1." Concluding by stating: "None of these citations describe an immediate detection of brain loci after performing step 1."

Appellant Response: The above issue is not addressed in the Final Office Action, and therefore neither in the Appeal Brief. The term "immediate" in claim element 6.2 relates to the time interval between the presentation of a characteristic stimulus and the identification of brain loci that manifest increased activation. Examiner's Answer, however, shifts the meaning of that term to the time interval between application of claim element 6.1 and claim element 6.2. Those skilled in the art would know that term relates to the intended time interval. There is, however, a challenge in identifying brain loci of interest from the numerous brain areas that manifest increased activation in response to the characteristic stimulus. This task is made more complex by interactions between activated brain areas.

The conceptual framework specifies that mental states are *spatially* represented in the brain, and that such representation is *hierarchical*. Thus, the complexity layer added by the temporal dimension is removed, making the task neuroanatomic rather than physiologic. In the case of exteroception, for example, activated loci-specific cortical columns are found within their respective submodality-specific area of each cerebral hemisphere, which, in turn, is located within its respective secondary modality-specific cortical area. As a consequence, loci of *all*

elements of a given submodality are within their submodality-specific cortical area, thus excluding other areas that manifest increased activation in response to characteristic stimulus.

In conclusion, persons skilled in the art have basic mastery of techniques of identifying brain areas manifesting increased (metabolic) activation. Such persons would have no difficulty in identifying brain loci of interest by applying the method of claim element 6.2 in the context of the specification, including its conceptual framework.

Examiner's Answer (page 5, bottom paragraph)

"Step 3 of claim 6 recites 'identifying among said brain loci that manifested activation in response to said stimulus, those whose inactivation selectively eliminates the behavioral response to the external stimulus, without eliminating the behavioral responses to external stimuli that induce other elements of sensation within the same submodality.'" The Examiner Answer then cites some references to the specification adding: "However, the cited pages in the specification do not disclose identifying brain loci that activated in response to an external stimulus whose inactivation would eliminate a behavior response to the external stimulus" adding (page 6): "Pages 15 and 23 are found under the section titled 'The Conceptual Framework' which suggests these pages discuss the background information." Beginning in line 6 the text reads: "Pages 38 and 39 discuss identifying activated brain loci, training mice to exhibit a behavior response to an external stimulus, and deactivating the brain loci with a neurotoxin, pages 38 and 39 do not describe where behavioral responses to external stimuli that induce other elements of sensation within the same submodality are not eliminated."

Appellant response: Examiner's Answer withdraws the determination which was made by the Examiner in the Final Office action, acknowledging that the method of claim 6.3 is applicable to mice, stating: "That Office action states (page 4, last paragraph): 'Furthermore, although the instant specification describes methods to detect brain loci that manifest increased activation as well as identifying brain loci whose deactivation selectively eliminates a behavioral response

in mice, the specification does not teach any other methods of identifying brain loci whose deactivation selectively eliminates behavioral response.”

This issue is raised a number of times by the Examiner’s Answer. The Appeal Brief quotes from the conceptual framework part of the specification (section 3.1): “In primates, the three-level hierarchy of modalities, submodalities and submodality elements is spatially represented in the cerebral cortex [0058]. Modality-specific areas contain submodality-specific areas, which in turn contain cortical columns representing submodality-specific elements.” Thus, the conceptual framework pre-identifies a submodality-specific brain area as containing loci that represent every element of that submodality. The hierarchical spatial organization locates any submodality-specific area within its (secondary) modality-specific area. There are a number of brain areas that are activated in response to any stimulus. The conceptual framework excludes all activated areas other than loci within a given submodality-specific area of interest. Such pre-identification first guides to identification of activated loci in response to stimuli in step 2. As a consequence, inactivation is applied only to loci activated within a submodality-specific area of interest. This conceptual guide is general, simple and precise. It is not always feasible, or a good practice, to crowd all relevant information into the same page. Appellant therefore takes issue of faulting the specification for not providing that information in pages 38 and 39.

Examiner’s Answer (page 6, last 2 lines): “Finally, there is no identification of brain loci whose inactivation eliminates the behavior response to the external stimulus.”

Appellant response: Appellant response above addressed this very issue. An example may clarify the issue. In rodents, each whisker is represented by a cortical column in the contralateral somatosensory cortex. Thus, the conceptual framework identifies that cortical column as the one that determines, and can evoke, the sensation of touch of the corresponding whisker. The application of the three method steps identifies the cortical column of interest. In step 1, the animal is trained to exhibit a behavior response to the stimulation of light deflection of a whisker one behavior response to the light deflection stimulation of the whisker of interest

and another response to the stimulation of other whiskers. In step 2, following repeated stimulation of the whisker of interest, the cortical column representing that whisker in the contralateral somatosensory cortex is identified by its increased activation. In step 3 the identified column is inactivated and behavior the correlated whisker is stimulated by light deflection. A cortical column that was identified in step 2 by its activation is the one that evokes the sensation of light touch in the stimulated whisker if its inactivation selectively eliminates the correlated behavioral response. The term 'selectivity' in the present specification means that behavioral responses to the light deflection other whiskers is not eliminated.

It is the application of the method steps within the context of the conceptual framework that makes it simple, clear and precise. Moreover, the conceptual framework shifts the locus of sensation from the mechanoreceptors associated with each whisker to the cortical column representing it in the somatosensory cortex. Thus, that simple protocol achieves something that has never been done before. It identifies a neural cluster that determines a particular submodality element of sensation. More generally, the conceptual framework shifts the locus of sensation from sensory receptors in the peripheral nervous system to the modality-specific cortical area of each cerebral hemisphere: the sensation of vision are evoked in the visual cortex, sensation of sound in the auditory cortex, sensation of taste in the gustatory cortex, sensation of smell in the olfactory cortex and sensation of touch in the somatosensory cortex. This notion is, again, simple, general, and precise. But it is also jarring, in denying that sensations are imported into the brain from the peripheral nervous system. Appellant is concerned that this counterintuitive aspect of the conceptual framework is a factor in the determination made by the Examiner.

Examiner's Answer continues as follows: "For example, on page 38 of the specification, after subjected to autoradiography. However, there is no mention of establishing a correspondence between sensation and an external stimulus with a voluntary behavioral response as required by step 1."

Appellant response: In step 1, animals are trained to exhibit behavior response that signifies the discriminatory response to a given stimulus. Voluntary behavioral responses are associated with the use of language. For this reason, voluntary behavioral responses are not usable with non-human species. Furthermore, it is best to minimize the ascription of sensations and other subjective states to non-human species. The issue here, again, is psychophysics. Examiner's Answer (page 7, first line) shows recognition that the specification requires that mice be *trained to exhibit a behavioral response to a stimulus*, rather than made to exhibit voluntary behavioral responses. The point made by Examiner's Answer faults imperfect formulation, not substance.

Examiner's Answer then continues: "There is no immediate detection of brain loci with increased transient activation as required by step 2, because the animals are scarified, which would not allow for immediate detection."

Appellant response: The meaning of a term, such as "immediate", depends on context. In the present case, it refers to avoiding, between the stimulation stage, and the detection stage, of any intervening activity that might modify activated brain loci, obscuring the correlation between stimulation and brain activation. The radioactive labeled glucose in brain slices identifies transiently activated brain loci. The point made by Examiner's Answer is semantic, not substantial.

Examiner's Answer continues (page 6, last sentence): "Finally there is no identification of brain loci whose inactivation eliminates the behavior response to the external stimulus."

Appellant response: Appellant addressed this objection on pages 6-7 above in discussing the conceptual framework and the identification of a cortical column that evokes the sensation of light touch in a whisker of a rodent.

Examiner's Answer continues: "On page 39 while mice are trained to exhibit a behavior response to a stimulus, there is no establishing of the correspondence between sensation and the external stimulus."

Appellant response: The point made above, again, relates to psychophysics. The explicit reference to subjective states is, by convention, limited to humans. In non-human species subjective states, such as sensation are imputed to behavioral responses to stimuli. Hence, the step expected by Examiner's Answer would be inappropriate and is excluded.

Examiner's Answer continues thus (page 7, line 3): "There is no immediate detection of brain loci that manifest transient increased activation after the first step; instead it appears that the brain loci were previously determined."

Appellant response: Step 1 involves psychophysics. It does not make any reference to the brain.

Examiner's Answer then states (page 7, line 5): "The final step does not teach where the behavioral responses to external stimuli that induce other elements of sensation within the same submodality are not eliminated."

Appellant response: Appellant addressed this objection on pages 6-7 above in discussing the conceptual framework and the identification of a cortical column that evokes the sensation of light touch in a whisker of a rodent. Additional discussion of this recurrent issue is addressed below.

Examiner's Answer concludes that paragraph thus (page 7, lines 7-8): "Thus the instant specification does not disclose the steps in context of the recited method."

Appellant Response: Applicant submits that those skilled in the art would recognize that the sequence of step number, the sequence of the presentation and the nature of the subject matter makes the context of the method steps clear.

3. *Response to arguments concerning the rejection of claim 6 rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement.*

Examiner's Answer (pages 8-9) presents the following eight factors viewed as requiring undue experimentation:

“(1) the quantity of experimentation necessary – undue experimentation would be required because the brain is a complex organ where different species have different types of responses to external stimulus. Thus, it would require undue experimentation to determine the actual steps for identifying brain loci and deactivating brain loci to eliminate a particular behavior without eliminating other behavior responses to external stimuli.”

Appellant response: This point of view was expressed also in the Final Office Action. As in a number of other instances, the Examiner's Answer does not address appellant's response in the Appeal Brief. Species differ in some respects and not in others. Science involves a search for commonalities, which also accounts for differences; thus the differences between species can be related to the common denominator of the DNA. Prior to the discovery of the structure of the DNA, differences between species were unrelated to an underlying common factor. The present invention applies this principle further by making explicit that what is true of all cells in an organism is also true for brain cells, and what is true of brain cells is also true of cells that determine mental states. These statements illustrates that the complexity of the brain and the differences between species does not automatically extends to all methods involveing the mind and brain. Appellant submits that the concepts and methods of the present invention are not species-dependent.

Examiner's Answer

"(2) *the amount of direction presented* – The specification does not disclose the method steps in context with each other."

Appellant Response:

Persons skilled in the art understand that the numerical sequence of steps, which is also the sequence of presentation of the steps, is also the sequence of carrying out these method steps.

Examiner's Answer

"(3) *the presence or absence of working examples* – On page 38 and 39, the specification does disclose work done on mice. However, as explained above, this example, does not describe the method steps as claimed or in context with each other."

Appellant Response: Presenting examples of physical working models is atypical of method patents. The specification provides persons skilled in the art with sufficient information how to carry out the identification steps. Disclosing the method steps in context is made clearer by drawings such as block diagrams. However, as stated in the Appeal Brief section 2.4, the informal drawings that were initially submitted apparently were not sent to the Drawing Review Branch as called for by 37 CFR §1.85(a); applicant never received the Notice of Draftsperson's Patent Drawing Review, thus excluding drawings from the specification.

Examiner's Answer:

"(4) *the nature of the invention* – the invention is drawn to a method of identifying brain loci of neural correlates of particular mental states."

Appellant Response: The above statement does not make explicit its relevance of the amount of experimentation needed. Instead, one is invited to understand the intended implication. It is a challenge. One possible implication is that the Examiner subscribes to the view that neural function and mental stats are attributes of *distributed neural network*, thus views the present

invention that involves localization to a cellular level, as running counter to that entrenched view. Appellant believes, however, that it would be inappropriate address unstated objections

Examiner's Answer

"(5) *the state of the prior art* - The prior art has not revealed identifying brain loci that manifest increased activation in response to the stimulus whose inactivation eliminates the behavior response to the external stimulus without eliminating the behavior response to the external stimulus without eliminating behavior response to the external stimuli that induce other elements within the same submodality."

Appellant Response: Appellant has presented in this reply the example of the sensation of light touch in rodents and humans. In mice, the inactivation of the somatosensory cortex column that represents a particular whisker eliminates the behavioral response to light deflection of that whisker, without eliminating the response of the mouse to light deflection of any other whisker. In humans, the inactivation of area 1 locus in the somatosensory cortex that represents that fingertip (1-2 square millimeters of cortical surface) eliminates the response to light touch stimulation of that fingertip, without eliminating response to light touch stimulation to any other point on the body surface. The specification makes several references to visual motion-direction. To recapitulate: There are eight submodality elements of visual motion-direction, (up, down, right, left, and the four diagonal directions). The specification identifies each of the eight types of motion-direction cortical columns in visual area V5/MT as those that determine, and can evoke, a direction-specific visual sensation. It has been demonstrated that:

1. Direction-specific visual motion stimulation increase activation of cortical columns that represent that motion-direction.
2. the inactivation of direction-specific cortical columns in the motion-direction submodality in the visual cortex eliminates the response to visual motion stimulation in that direction, without eliminating behavior responses motion-direction stimulation of any of the

direction, without eliminating behavior responses motion-direction stimulation of any of the other seven motion-directions (Blanke O et al. Direction-specific motion blindness induced by focal stimulation of human extrastriate cortex. *Eur J Neurosci.* 2002).

Examiner's Answer

"(6) *the relative skill of those in the art* – The relative skill of those in the art is high."

Appellant Response: This conclusion is true only if the conceptual framework is excluded.

Examiner's Answer

"(7) *the predictability or unpredictability or unpredictability of the art* – Because the brain is a complex organ that is not fully understood, determining loci of the brain with particular characteristic is unpredictable."

Appellant Response: Predictability and unpredictability are not intrinsic aspect of brain function but the state of knowledge of brain function. The examples given in this reply brief regarding light touch in rodents and humans and regarding visual motion-direction indicates point to a different conclusion than the reached by Examiner's Answer.

Examiner's Answer

(8) *The breadth of the claims* (pages 9-10), referring to page 39, lines 2-6, of the specification conclude thus (page 10, lines 3-6): "The passage makes no mention of testing for behavior response to the external stimuli that induce other elements of sensation within the same submodality. Thus, one of skill in the art would be required to develop this test in order to practice the claimed invention."

Appellant response: The objection is stated by Examiner's Answer in several different ways, and Appellant has responded to that objection several times in this reply brief. The present invention couples a fundamentally new conceptual framework with known techniques that are

of known techniques to the conceptual framework that makes the invention of transformative significance. The Examiner Answer downgrades the conceptual framework to “information,” treating that “information” as “background”, thus effectively removing it from the specification. Having done that, Examiner’s Answer determines that specification does not meet the description and enablement requirements, and involve undue experimentation. Appellant submits that the reply has shown this determination to be erroneous.

Examiner’s Answer (page 10, middle and last paragraphs)

Examiner’s Answer addresses differences between species, stating: “The brain is complex organ where different species have different types of responses to external stimulus. For example, on page 37 of the specification, the Applicant discusses how there are several important differences between mice and humans. The specification does not teach how the tests for mice (i.e. deactivating brain loci without eliminating the behavior response to the external stimuli that induce other elements of sensation within the same submodality) are to be modified to apply those tests to other species. Thus, for one of skill in the art to perform the claimed method on other species, one of skill in the art would have to develop tests that are uniquely suited for the brain of other species. Such a requirement to develop these tests without any guidance from the specification would require undue experimentation. The claims as written are an invitation to experiment and constitute undue experimentation based on the unpredictability in this technical area and the lack of guidance as to how the claimed method steps are to be performed.”

Appellant Response: The above statement overlaps those made by Examiner’s Answer in response to Appellant argument concerning the enablement requirement. Appellant combined reply is found in pages 18-20 below.

invention that involves localization to a cellular level, as running counter to that entrenched view. Appellant believes, however, that it would be inappropriate address unstated objections

Examiner's Answer

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Appellant Response: Appellant has presented in this reply the example of the sensation of light touch in rodents and humans. In mice, the inactivation of the somatosensory cortex column that represents a particular whisker eliminates the behavioral response to light deflection of that whisker, without eliminating the response of the mouse to light deflection of any other whisker. In humans, the inactivation of area 1 locus in the somatosensory cortex that represents that fingertip (1-2 square millimeters of cortical surface) eliminates the response to light touch stimulation of that fingertip, without eliminating response to light touch stimulation to any other point on the body surface. The specification (e.g. section B2 and substitute specification page 22, lines 10-18 and lines 19-27; page 23, lines 1-2), makes reference to visual motion-direction. To recapitulate: There are eight submodality elements of visual motion-direction, (up, down, right, left, and the four diagonal directions). The specification identifies each of the eight types of motion-direction cortical columns in visual area V5/MT as those that determine, and can evoke, a direction-specific visual sensation. It has been demonstrated that:

1. Direction-specific visual motion stimulation increase activation of cortical columns that represent that motion-direction.
2. the inactivation of direction-specific cortical columns in the motion-direction submodality in the visual cortex eliminates the response to visual motion stimulation in that

direction, without eliminating behavior responses motion-direction stimulation of any of the other seven motion-directions (Blanke O et al. Direction-specific motion blindness induced by focal stimulation of human extrastriate cortex. *Eur J Neurosci.* 2002).

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“(6) *the relative skill of those in the art* – The relative skill of those in the art is high.”

Appellant Response: This conclusion is true only if the conceptual framework is excluded.

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Appellant Response: Predictability and unpredictability are not intrinsic aspect of brain function but the state of knowledge of brain function. The examples given in this reply brief regarding light touch in rodents and humans and regarding visual motion-direction indicates point to a different conclusion than the reached by Examiner's Answer.

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Appellant response: The objection is stated by Examiner's Answer in several different ways, and Appellant has responded to that objection several times in this reply brief. The present invention couples a fundamentally new conceptual framework with known techniques that are

familiar to those skilled in the art, and therefore do not need to be taught. It is the application of known techniques to the conceptual framework that makes the invention of transformative significance. The Examiner Answer downgrades the conceptual framework to “information,” treating that “information” as “background”, thus effectively removing it from the specification. Having done that, Examiner’s Answer determines that specification does not meet the description and enablement requirements, and involve undue experimentation. Appellant submits that the reply has shown this determination to be erroneous.

Examiner’s Answer (page 10, middle and last paragraphs)

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Appellant Response: The above statement overlaps those made by Examiner’s Answer in response to Appellant argument concerning the enablement requirement. Appellant combined reply is found in pages 18-20 below.

REPLY TO EXAMINER'S ANSWER RESPONSE TO ARGUMENTS

Examiner's Answer - (page11, lines 4-6): "Applicant argues that the Examiner misconstrued the specification. However, the applicant has not stated how the Examiner misconstrued the specification, and it is unclear to the Examiner how he has misconstrued the specification."

Appellant response:

1. The statement of the Examiner's answer, repeated below, appears to reflect misconstruction of the specification: "(5) *the state of the prior art* - The prior art has not revealed identifying brain loci that manifest increased activation in response to the stimulus whose inactivation eliminates the behavior response to the external stimulus without eliminating the behavior response to the external stimulus without eliminating behavior response to the external stimuli that induce other elements within the same submodality." Appellant has shown that prior art does reveal such selective inactivation.

2. Examiner's Answer withdrawal the rejection of claim 6 as being anticipated by Trivedi et al. in regards to claim element 6.3. By so limiting the withdrawal one may get an incorrect impression as to the extent of the misconstruction reflected by the systematic misattribution of all aspects of the present invention to Trivedi et al. To recapitulate:

- 2.1 The Final Office Action attributes to Trivedi et al. all aspects of the present invention
- 2.2 The Appeal Brief argues Trivedi et al. anticipated no aspect of the invention
- 2.3 Examiner's Answer does not counter any of appellant arguments on this issue
- 2.4 Hence, the misconstruction of the specification has been fundamental.

3. More basic misconstruction of the specification is the systematic reference to the conceptual framework, which is the central part of the specification as "background information" in discussing grounds for rejection of each of the three claim elements:

3.1 In claim element 6.1 (page 4, lines 10-11): “Pages 14-17 and 20 and 21 are found under the section titled “The Conceptual Framework” which suggests these pages discuss the background information.”

3.2 In claim element 6.2 (page 5, lines 9-10: Adding (line 8): “Pages 14-21, 29 and 30 are found under the section titled “The Conceptual Framework” which suggests these pages discuss background information.”

3.3 In claim element 6.3 (page 6, lines 3-4): “Pages 15 and 23 are found under the section “The Conceptual Framework” which suggests these pages discuss the background information.”

Examiner’s Answer (page 11, lines 7-10): “Applicant also argues under MPEP 707.07(j) that he asked the Examiner to formulate a claim. Under MPEP 707.07(j), the Examiner may expedite prosecution by helping to formulate a claim if it becomes apparent that the claims are allowable. However, it has not become apparent to the Examiner that the instant claim is allowable.”

Appellant Response: In the Appeal Brief, appellant anticipated that the rejection of claim 6 be withdrawn. In addition, the Examiner, in the Final Office Action conceded that claim element 6.3 is applicable to mice, stating (page 4, point 6): “Furthermore, although the instant specification describes methods to detect brain loci that manifest increased activation as well as identifying brain loci whose deactivation selectively eliminates a behavioral response in mice, the specification does not teach any other methods of identifying brain loci whose deactivation selectively eliminates behavioral response.” These two factors, taken together, were the basis for the request that the Examiner formulate a claim under 707.07(j). That request was made void by the Examiner’s Answer reversal of the above quoted determination by the Examiner in the Final Office Action.

The Examiner's Answer passes in silence over most arguments presented in the Appeal Brief.

1. The Examiner's Answer passes in silence, for example, over section 2 of the Appeal Brief (pages 7-8). Section 2 argues that the present patent application involves a new field of invention and that this contributed to a flawed examination process and outcome. Subsection 2.4 gives an example how the flawed examination process contributed to the non-inclusion of the drawings in the specification.

2. The Examiner's Answer then passes in silence over the next subsection, 3.1 (page 8, last paragraph), which relates to the main issue of the appeal: the role of the conceptual framework part of the specification. The conceptual framework pre-identifies the area within which the loci of interest are to be found using the three stages of claim 6.

3. The Examiner's Answer then passes in silence over subsection 4.1, the Applicant Response in to Examiner position in the Final Office Action that claim element 6.1 does not teach how to apply methods of psychophysics. Applicant responded as follows: "The difference between the first and the second claim elements clarifies the issue. The first claim element involves psychophysics. It does not require, and typically does not involve, reference to the brain. The second claim element does involve brain response. Psychophysics is a 100-year-old discipline. Its techniques are well known to those skilled in the art and do not need to be taught. In many cases in fact, descriptions of neuropsychological tests omit the psychophysics stage and proceed directly to the stage that involves brain response. The Trivedi patent (discussed below), is an example of that practice. The first claim element makes explicit that publicly observable behavioral responses can be correlated with sensations, which are not publicly observable." Examiner's Answer, after opting not to counter Applicant Response, reiterates the position stated by the Examiner in the Final Office Action.

4. Examiner's Answer passes in silence over Applicant Response to determination, made by the Examiner in the Final Office Action, that the method of claim element 6.3 is limited to mice. Examiner's Answer reverses that determination. In sharp contrast to the explicit manner in which the Examiner's Answer announced the withdrawal of the rejection of claim 6 as being anticipated by Triveid et al., the fundamental reversal from the Last Office action concerning the applicability of the method of claim 6.3 to mice is left undeclared.

5. Examiner's Answer passes in silence over the arguments in sections 5, 6 and 7 of the Appeal Brief, which show that Trivedi et al. do not anticipate *any* single aspect of the present invention.

Reply to Examiner's Answer to appellant argument concerning the enablement requirement

Examiner's Answer (pages 11-12) reiterates the objection that the specification does not enable those skilled in the art how to apply claim element 6.3, concluding thus: "The Examiner maintains that the claims as written are an invitation to experiment and constitute undue experimentation based upon the unpredictability in this technical field area and lack of guidance as to how the claimed method steps are to be performed."

Appellant Response:

Differences exist not only between species, but also between groups within species and between individuals of a given group. In each of these cases there are also commonalities. Science accounts for differences relative to basic common factors: differences between chemical elements in terms of the number of protons in the nucleus, differences between species in terms of DNA, and differences of cell types of an organism in terms of methylation pattern of the chromatin or in terms of their constitutively-expressed proteins. It was only during the pre-theoretic stage that chemical elements, species and cell types were deemed to be uniquely different. Hence, the reference in the statement above to the need "to develop tests that are uniquely suited for the brain of other species" is an unusual position. It is indeed the case that the adaptation of a general-purpose method to special-purpose needs results in a

unique method or device, as with the flight simulating computer. But such a computer would be a special case of general-purpose computing; there would be nothing unique in its execution of algorithms.

Examiner Answer The statement opens with (page 10, lines 7-8): “The brain is complex organ where different species have different types of responses to external stimulus” and concludes (page 10, bottom paragraph): “The claims as written are an invitation to experiment and constitute undue experimentation based on the unpredictability in this technical area and the lack of guidance as to how the claimed method steps are to be performed.”

Appellant Response:

It is crucial to note that predictability and unpredictability are not intrinsic attributes of the subject matter, but instead reflects a perspective at a point in time about the state of knowledge of a particular field. The specification presents a different perspective. An example could make the issue clearer. Above, appellant showed how simple it is to identify a cortical column in the mouse that determine, and can evoke, the sensation of light touch of a particular whisker. How does the conceptual framework address the differences between mice and humans with regards to the sensation of light touch? Let light touch to the right fingertip replace in humans the deflection of a whisker in mice. The conceptual framework identifies the somatosensory cortex SI as the area where sensations of touch are determined and evoked (thus denying that sensations of touch are received from sensory receptor cells in the skin). Within SI, the conceptual framework identifies Brodmann area 1 (area 1) as the submodality-specific area for the sensation of touch on the body surface, and further specifies that the cortical columns representing the right fingertip are to be found in the contralateral (left, in this case) hemisphere (substitute specification page 19, lines 19-27; page 23, lines 1-7).

In step 1, an appropriate human subject would be instructed to exhibit a particular voluntary behavioral response, which may include the use of language, to indicate the sensation of light touch, and to point to location on the body surface that feels as being touched.

In step 2 (substitute specification page 21, lines 16-25), the locus representing the right fingertip in area 1 of the contralateral (left) hemisphere is identified by its preferential activation in response to light touch stimulation to the right fingertip. Activation can be detected by fMRI prior to the operation or during the operation. Alternatively, the locus representing the right fingertip can be identified when invasive access is available by detecting increased activation in the form of local evoked potential. Optionally, the specification makes identification of activated by direct stimulation. A conscious person then reports or points to the locus of the body surface that is felt as touched. Such a subject would report sensation of light touch in the right fingertip on the direct stimulation of the locus in area one (in the contralateral hemisphere) that represents that fingertip.

In step 3 (substitute specification, page 21, lines 26-28; page 22, lines 1-2), the identified locus is then reversibly inactivated by using a technique such as local application cooling or Lidocaine. The subject is then tested for responses to light touch stimulation. If the response to touching the right fingertip is eliminated, but responses to light touch to any other finger elicits normal behavioral response, then inactivated brain locus is proved to be the one that determines, and can evoke, the sensation of light touch in the right fingertip.

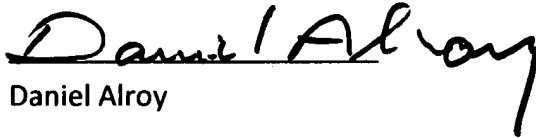
The above example highlights that the use of language and voluntary behavioral responses is limited to humans and that invasive access to the living human brain is possible only in connection with medical necessity. However, apart from the difference between voluntary and trained responses, the technique applies to humans as well as mice.

VIII. CONCLUSION

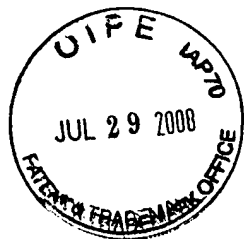
1. Appellant believes that the arguments presented show that the Specification meets the description and enablement requirements.
2. Appellant believes that it would be premature, wrong and not in the public interest that the Examiner's determination be allowed to be final.

Accordingly it is respectfully submitted that the rejection of Claim 6 should be reversed.

Respectfully submitted,


Daniel Alroy

Dated: July 29, 2008



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July 29, 2008

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